YSI Environmental Pure Data for a Healthy Planet.®

Tech Note

True Dye vs. Dye Tracer for the YSI 6130 Rhodamine Probe

The Rhodamine probe is recommended to be calibrated with a Rhodamine WT dye which should be purchased from Keystone Aniline Corporation, per the information provided in the Environmental Monitoring Systems Manual, Principles of Operation, Rhodamine WT Standard Solution – Preparation and Use. As purchased for preparation of calibration standards and for direct use, the solution is approximately 20% rhodamine WT by weight, or 200 g/L. There appear to be two distinct conventions for dealing with Rhodamine WT concentrations and this is causing confusion for some YSI customers: True Dye vs. Dye Tracer.

Convention 1: True Dye

The 20 % Rhodamine WT dye solution is considered only as a source of Rhodamine WT. Under this "True Dye" convention the fact that the Keystone reagent is 20 % Rhodamine WT by weight is considered in solution preparation and data analysis. Concentrations of these solutions or in field measurements are given in µg of Rhodamine WT per liter of solution. For example, if the instructions in the manual for dilution of the 20 % Rhodamine solution are followed, one liter of the resulting standard contains 100 µg of Rhodamine WT.

Convention 2: Dye Tracer

The 20 % Rhodamine WT dye solution, "Dye Tracer", is considered as a reagent in its own right rather than just being a solution of Rhodamine WT. The solution and the concentration convention are thus designated as "Dye Tracer". Concentrations are then given in µg of dye tracer per liter of total solution. For example, if the instructions in the manual for dilution of the 20 % Rhodamine solution are followed, one liter of the resulting standard contains 500 µg of dye tracer. Note that the standard for the two conventions is the same and it is prepared the same way, but contains 5 times the amount reagent under the Dye Tracer convention as it does under the True Dye convention because the dye tracer is only 20 % True Dye. In other words, the intermediate concentrate in step 2 of the preparation would be labeled "500 mg/L Dye Tracer" instead of "100 mg/L Rhodamine WT" because we are counting whole 500 mg of the concentrate instead of 20% of 500 mg or 100 mg. The standard in step 3 would then be labeled; "500 µg/L Dye Tracer" instead of "100 µg/L Rhodamine WT".

NOTE CAREFULLY: In dealing with both calibration solution and field readings, it is important to note the YSI software deals ONLY with the True Dye convention. If sensors are attempted to be calibrated using the Dye Tracer convention, calibration range errors will occur, so always calibrate using the true dye convention.

However, users can still operate under the Dye Tracer convention using YSI systems if they note the following changes in specifications and effects on field readings.

Field Readings

To convert YSI (True Dye) values into Dye Tracer readings, simply multiply the readings from the YSI instrument by a factor of 5. For example, if the YSI field reading is 10 µg/L, this is identical to a Dye Tracer concentration of 50 µg/L. This multiplication can readily be performed in spreadsheets or data bases for large data files.

Specifications

Accuracy

True Dye: ±5% of the reading or ±1 µg/L, whichever is greater
Dye Tracer: ±5% of the reading or ±5 µg/L, whichever is greater

Range

In YSI units ("True Dye"): 0 to 200 µg/L of True Dye
In "Dye Tracer" units: 0 to 1000 µg/L of Dye Tracer

Resolution

In YSI units ("True Dye"): 0.1 µg/L of True Dye
In "Dye Tracer" units: 0.1 µg/L of Dye Tracer

Detection Limit

YSI provides no detection limit specification for the Rhodamine WT sensor in conjunction with 6-series sondes. Users who wish to empirically establish a detection limit should note that the value will always be 5 time greater for the Dye Tracer Convention than for the True Dye Convention. For example, if a detection limit of 0.5 µg/L were determined in True Dye convention, the detection limit would be 2.5 µg/L in the Dye Tracer convention. Naturally, this means that the 5 times more Dye Tracer Solution than True Dye is required for detection and this is obviously a consequence of the fact that the Dye Tracer solution contains only 20 % True Dye.

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